

ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Plant Abstract

Element Code: PPISO01010

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Isoetes bolanderi*
COMMON NAME: Bolanders Quillwort
SYNONYMS:
FAMILY: Isoetaceae

AUTHOR, PLACE OF PUBLICATION: Engelmann, Georg. American Naturalist
8(4): 214. 1874.

TYPE LOCALITY: California; Upper Tuolumne River.

TYPE SPECIMEN: NY 76805. Henry N. Bolander, #5091. 1866.

TAXONOMIC UNIQUENESS: *Isoetes* is a large genus with 34 species in the United States.
I. bolanderi is the only species that occurs in Arizona.

DESCRIPTION: Plants aquatic, occasionally emergent. Rootstock nearly globose, 2-lobed. Leaves deciduous, bright green, pale brown toward base, spirally arranged, to 20 cm, pliant, abruptly tapering to fine tip. Velum covering less than 1/2 of sporangium. Sporangium wall ± brown-streaked. Megaspores white, 300--500 µm diam., rugulate to tuberculate; girdle obscure. Microspores brown in mass, 20--30 µm, spinulose.

AIDS TO IDENTIFICATION: *I. bolanderi* grows from a corm-like stem which remains buried in the mud, producing pointed, cylindrical leaves approaching 20 centimeters in maximum length.

ILLUSTRATIONS:
Herbarium mounts: <http://eol.org/pages/597787/media>.

TOTAL RANGE: North and west from New Mexico to the west coast States and into Canada (Alberta and British Columbia).

RANGE WITHIN ARIZONA: *I. bolanderi* has been collected from five sites in Arizona. Two of these sites are along the Mogollon Rim in Coconino County and the collections were made over 30 years ago, so there is a question as to whether the species is still extant there. The other three collection sites are from NE Apache County, in the Lukachukai-Chuska Mountain area. One site has not been collected since 1980, but the other two yielded specimens as recently as 2001.

SPECIES BIOLOGY AND POPULATION TRENDS

GROWTH FORM: Perennial, herbaceous, graminoid-like aquatic plant growing from a corm-like stem.

PHENOLOGY: Spores mature late summer.

BIOLOGY: Reproduces via spherical sporangia.

HABITAT: Alpine or subalpine lakes and ponds, and adjacent saturated soils.

ELEVATION: Range-wide: 6000-8900 feet (1900-2700m). Arizona collections range from 7570 – 8950 feet (2310-2730m.)

EXPOSURE: Not specified.

SUBSTRATE: Saturated soils. Soil deposits on pond bottom are relatively deep, and show very fine, homogeneous texture (derived from insitu and alluvial processes from Chuska sandstone and organics).

PLANT COMMUNITY: Aquatic communities within western yellow pine, Ponderosa pine and Douglas fir forests. Associated species includes: *Eleocharis*, *Glyceria*, *Ranunculus*, *Veronica*, *Quercus*, *Alisma plantago-aquatica*, *Potamogeton*, *Scirpus*, *Tamarix*, *Arnica chamissonis*, *Erigeron flagellaris*, *Taraxacum officinale*.

POPULATION HISTORY AND TRENDS: Populations in a few ponds along the Mogollon Rim in Coconino County have not been seen in recent decades due to the lowering of the local water table, but the spores are long-lived and the species may reappear if conditions change. Plants in the Lukachukai Mountains of Apache County still appear relatively secure (Windham and Ytskievych, 2009). At one of the Lukachukai sites, the species has been collected over a 20 year span, and the 1980 collection noted that the plant was abundant.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: None.

STATE STATUS: None.

OTHER STATUS: None.

MANAGEMENT FACTORS: *I. bolanderi* is an aquatic obligate species, and it appears that the lowering of the water table in the Mogollon Rim locality where it had been collected has resulted in its disappearance.

PROTECTIVE MEASURES TAKEN: None known.

SUGGESTED PROJECTS: It is important to monitor the lakes and ponds in the Lukachukai Mountains (Navajo Nation) where the species has been collected, and in other waters of the area. This is the only refuge for the species in Arizona.

LAND MANAGEMENT/OWNERSHIP: The two historic collections along the Mogollon Rim in Coconino County were from within the Apache-Sitgreaves National Forest. The other three known collections are from the Navajo Nation and Apache County.

SOURCES OF FURTHER INFORMATION

REFERENCES:

- Encyclopedia of Life, accessed 4/29/2014, <http://eol.org/pages/597787/details>.
JSTOR| Global Plants, accessed 4/29/2014, <http://plants.jstor.org/specimen/ny00076805?s=t>.
NatureServe Explorer, an Online Encyclopedia of Life, accessed 4/29/2014, <http://explorer.natureserve.org/servlet/NatureServe?searchSciOrCommonName=Isoetes&x=12&y=12>.
Tropicos, accessed 4/29/2014, <http://www.tropicos.org/Name/26602039>.
Windham, M. D. and G. Yatskievych. 2009. Vascular Plants of Arizona: Isoëtaceae. CANOTIA 5 (1): 27–29.

MAJOR KNOWLEDGEABLE INDIVIDUALS:

ADDITIONAL INFORMATION: A single historical specimen from the Huachuca Mountains originally was referred to var. *pygmaea* (Englem.) Clute, a small-leaved form not recognized by most current botanists. It has not been relocated in Cochise County in modern times (Windham and Yatskievych, 2009).

Revised: 2014-04-29 BDT

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Arizona Game and Fish Department. 20XX (= year of last revision as indicated at end of

abstract). X...X (= **taxon of animal or plant**). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. X pp.